

Environmental Center for Livestock Waste Management (ECLWM)

Location: Neipu, Southern Pingtung County
Type: State-of-the-art research facility for waste handling and processing
Size: 48,000 L/d
Funding: Total: US\$3,150,000
 Private: US\$800,000
 Public: US\$2,350,000
Objective: To advance the state of the art of swine production/waste management to, among other things, protect drinking water.
Duration: 1997–1999
Scale: Rural

Summary

After researchers identified pig-farm waste as one of Southeast Asia's major environmental problems, faculty from the National Pingtung University of Science and Technology (NPUST) and several United States (US) universities, equipment manufacturers, and federal agencies cooperated to establish the ECLWM. At the ECLWM, team members have designed and built a prototype swine manure-management system that provides training and demonstrations for innovative, cost-effective waste management technologies that include recycling of discharge water for irrigation. Currently



focused on swine waste, the prototype will eventually include poultry and bovine waste management.

In-Country Principles That Attracted Nondonor Financing

- Capacity building and informed decision making
- Public participation in, and support of, sustainable development
- Institution building and access to justice and enforcement of laws

Specific principles that aided in attracting private funding contributions for the ECLWM included the following: multi-objective decision making about water resources at the basin scale; strong, effective, and culturally appropriate institutional, policy, and legal frameworks; effective coordination among sectors and across multiple geographic and institutional scales; an emphasis on decision making and assignment of authority at the lowest appropriate level; and a commitment to creating and strengthening strong human and organizational capacity for sustainable and integrated water management in both the public and private sectors.

An additional in-place guideline that helped reduce risk and mobilize financial resources was the consideration of water as an economic, social, and environmental good, including the transparent, equitable, and sufficient allocation of the full costs of water management throughout society.

Financing

Total investment costs were US\$3,150,000. Taiwan invested US\$2,000,000 in the construction and operation of the ECLWM. Five American universities donated engineering services (an in-kind contribution of US\$300,000) to design the waste treatment system, and several US manufacturers contributed their equipment (valued at US\$500,000) to the center. The US-Asian Environmental Partnership (US-AEP) contributed US\$350,000 to the project.

The Project

Over the past several years, countries worldwide have witnessed a shift from small pig farms to large-scale operations. While production has increased, the supply of land for proper treatment of swine waste has decreased. Plans for the

ECLWM began in 1996 after pig-farm waste was identified as a major environmental problem. Construction began in 1999, and the center is now housed on the 285-ha campus at NPUST, Taiwan.

The ECLWM is a first-of-its-kind, international training and demonstration center for the Asian region. It develops and demonstrates innovative, cost-effective technologies that impact livestock waste policies, comply with regulatory requirements, and provide technology transfer to producers in the US and Asia.

Because of the project, various waste management techniques, ranging from simple composting to cutting-edge treatment, have been shared, making the ECLWM an excellent example in the transfer of environmental protection technology and cost-effective solutions for the future of sustainable agriculture.

The ECLWM is not only a partnership between the US and NPUST, but also a regional center that engages leading livestock-raising countries in Asia such as Korea, the Philippines, Thailand, Malaysia, and Hong Kong.

Technical Data

Technologies used at the center include anaerobic digesters and batch reactors for aerobic processing. Such technologies yield a range of useful end products, including discharge water that meets regulatory standards, fertilizer, compost, and energy. The ECLWM integrates various livestock waste management systems and technologies to address different situations and conditions.

Performance Data

The ECLWM treats waste (48,000 L/d and 2.2% solids) from a 240-sow (female pig), farrow-to-finish operation.

By sharing waste management information, the ECLWM effectively transfers environmental protection technology and cost-effective solutions for the future of sustainable agriculture. The ECLWM hosts observers from around Asia, showing them new ways to address similar problems at home. It also provides for collaborative research and training activities.

Participants and Roles

The ECLWM is a product of a unique public-private consortium of leading US and Asian government agencies, companies, and universities in the field of waste management. Taiwan has contributed the bulk of funding for building and operating the ECLWM. US partners include five universities (Illinois Institute of Technology, Iowa State University, North Carolina State University, Oregon State University, and Purdue



University), which donated engineering services; the Equipment Manufacturers Institute, whose members contributed equipment; the US Environmental Protection Agency (USEPA), which led the program and provided a major financial contribution; the US Department of Agriculture, which provided extension and engineering services; and the US Department of Commerce. The Environmental Exchange Program, administered by the Institute of International Education, provided funding for travel and training, and the Environmental Technology Network for Asia Program provided technical support, including identifying and notifying US companies of the project and inviting them to participate in the endeavor.

Partner Contacts

Dr. Randolph Yamada
US-Asia Environmental Partnership Program
US Agency for International Development
1300 Pennsylvania Avenue, NW, 4th floor
Washington, DC 20523 USA
Phone: 202-712-1699
Fax: 202-216-3379
E-mail: ryamada@usaid.gov

Dr. Shan-Da Liu
National Pingtung University of Science and Technology
1 Hsue-Fu Road, Neipu, Pingtung 91027 Taiwan
Phone: 886-8-770-3660
Fax: 886-8-770-2226
E-mail: shanda@mail.npust.edu.tw